KOCAELI UNIVERSITY

MECHATRONICS ENGINEERING

<COURSE NAME>

FINAL REPORT

Open Source General Purpose 2-Axis Satcom-on-the-Move Pedestal for Ku Band Antennas

Project Group

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ABSTRACT

In this project we have designed and constructed a low cost and open source hardware, general purpose 2-axis satcom-on-the-move stabilized tracking mount that can also be used to house different apparatus that needs similar tracking and disturbance rejection capabilities. For disturbance rejection we have used a 6 DoF strapped down IMU, but the algorithm itself was designed for 10 DoF IMUs with integrated magnetometer sensors for absolute orientation data. Alas for budget concerns we have opted to go with using dead-reckoning from a calibrated position at epoch. Using this method we have achieved acceptable results that suffice for a proof-of-concept prototype. The current results focus on the disturbance rejection i.e. gimbal capabilities of the mount as most Ku-Band satellites of concern for SOTM terminals are usually in geostationary orbit while the pedestal design itself is capable of tracking low-earth-orbit satellites if more precise and more rigid mechanical components are used and tracking coordinates as azimuth and elevation angles are calculated. The pedestal employs parts that are optimized for additive manufacturing and to be coupled with standard and easy to acquire parts for easy assembly, extensibility and repair. One of the main goals of this project was to create a platform in which anybody that can acquire the parts can build a pedestal for any tracking and disturbance rejection application while freely modifying and building on the design. As we openly distribute the design files and details of this project we believe we have completed this crucial goal.

ÖZ

Bu projede düşük bütçe ve açık kaynakk olarak genel kullanıma uygun 2-eksenli bir mobil uydu terminalini yaptık. Farklı takip ve dengeleme aplikasyonları bütçe ve açık kaynak olarak